

Amendment and Response
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REMARKS

For the convenience of the Examiner, presented below is another copy of the Remarks submitted with the Amendment and Response to Office Action that was submitted on December 14, 2005.

Applicant hereby amends claims 11 and 14. After entry of these amendments, claims 1-28 will be pending in the application and are presented for consideration. Claims 29-79 are presently withdrawn from consideration. Applicants submit that these amendments introduce no new matter to the application. Support for these amendments can be found in the application as originally filed, e.g., in paragraphs 0091 and 0092.

Rejection under 35 U.S.C. § 112

The Office Action rejects claims 11 and 14 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that the applicant regards as the invention. Applicant hereby amends these claims. Claim 11 is amended to recite that “the glass comprises at least one of... [list], including natural, and commercial grades.” Claim 14 is amended to recite that “the glass-ceramic comprises at least one of... [list], and related commercial ceramic materials.” Applicant believes that these clarifying amendments are fully supported by the specification, e.g., in paragraphs 0091 and 0092, and introduce no new matter to the application. Applicant submits that these amendments overcome the indefiniteness rejection.

Rejection under 35 U.S.C. § 102

The Office Action rejects claims 1-4, 6, 9, and 19-28 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,040,087 to Kawakami (“Kawakami”), stating that Kawakami describes “hydrogen being stored in a hollow region [101] disclosed as a core layer” (page 2 of the Office Action).

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Applicant's claim 1 recites a "composite material assembly for reversibly transferring a gaseous element comprising...at least one hollow region for containing the gaseous element" (emphasis added). The hydrogen accumulates in and can be stored as gas in the hollow region 26 of the microsphere 20.

Applicant's hollow region is exemplified as the hollow region 26 of a microsphere for the accumulation and storage of hydrogen (see, e.g., FIGs. 2 and 3A, and paragraphs 0080 and 0094). This exemplary embodiment provides for charging of the hollow regions 26 of the microspheres to such an extent that high concentrations of hydrogen can be stored in the hollow regions 26. The effect is so pronounced that extended electrochemical charging can actually result in overpressuring and rupturing of the microspheres 20 (see para. 0121).

In contrast, the core layer [101] of Kawakami is merely a hydrogen storage alloy that, Applicant submits, merely has the hydrogen storage capabilities and capacities previously known and described as prior art in the present application. Since Kawakami does not teach or suggest a composite material including at least one hollow region for containing a gaseous element, Applicant submits that Kawakami is missing at least this element of Applicant's claimed invention.

Moreover, Applicant submits that Kawakami actually teaches away from the invention of claim 1. In the paragraph starting on line 44 of column 2, Kawakami teaches that "[t]he most specific feature of the present invention [of Kawakami] lies in a powdery material comprising a hydrogen-storing compound comprising a core layer mainly composed (sic) of a hydrogen storage alloy...." The core layer [101] of Kawakami is not a hollow region, as claimed by Applicant. By suggesting that the core layer of Kawakami be a hydrogen storage alloy, Kawakami explicitly teaches away from a composite material having a hollow region (26) for containing a gaseous element, such as the hollow region claimed by the Applicant in claim 1.

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Similarly, Applicant's independent claim 21 also recites "at least one hollow region for containing the gaseous element." For all of these reasons Applicant submits that independent claims 1 and 21, and all claims that depend therefrom, are not anticipated by Kawakami.

Rejection under 35 U.S.C. § 103(a)

The Office Action rejects claims 5, 7, 8, 10-17, and 18 as being anticipated by Kawakami under 35 U.S.C. § 102(b), or in the alternative as being obvious over Kawakami under 35 U.S.C. § 103(a), or as being unpatentable over Kawakami in view of U.S. Patent No. 3,607,787 to Jung ("Jung").

As described above, Applicant submits that Kawakami does not teach or suggest a composite material with at least one hollow region for containing the gaseous element as recited in claims 1 and 21. Jung does not cure the defects of Kawakami.

Jung describes a method for preparing a material which includes sorbing hydrogen into the particles of a hydrogen-sorbing metallic material (see the Abstract of Jung). Jung explains that "[m]any metals are known which have the capability of sorbing hydrogen and to activate hydrogen" (col. 4, lines 13-14). As noted by the Examiner, Jung teaches a coating for a battery electrode. However, Jung merely describes coating carrier materials, such as alkali-resistant silicates, with the hydrogen-sorbing metallic material to lower the cost of such electrodes. Applicant finds no mention in Jung of hollow regions within a composite material, or the use of such hollow regions to contain a gaseous element. Thus, Applicant respectfully submits that neither Kawakami nor Jung, either alone or in combination, teach or suggest a composite material with a hollow region for containing a gaseous element as recited in Applicant's independent claims 1 and 21. For all of these reasons Applicant respectfully submits that claims 1 and 21, and all claims that depend therefrom, define patentable subject matter.

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Applicant requests that the Examiner reconsider the application and claims in light of the foregoing Amendment and Response, and respectfully submit that the claims are in condition for allowance. If the Examiner believes that a telephone conversation with Applicant's attorney would expedite allowance of this application, the Examiner is cordially invited to call the undersigned attorney at (617) 526-9626.

Respectfully submitted,



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